PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents
United States Patent and Trademark Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 20 March 2000 (20.03.00)	
International application No. PCT/CA99/00731	**Applicant's or agent's file reference** 1811-220/MIS
International filing date (day/month/year) 11 August 1999 (11.08.99)	**Priority date** (day/month/year) 14 August 1998 (14.08.98)
Applicant TZOGANAKIS, Costas et al	

1. The designated Office is hereby notified of its election made:

   [X] in the demand filed with the International Preliminary Examining Authority on:

   21 February 2000 (21.02.00)

   [ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

   [ ] was not

   made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Juan Cruz

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

STEWART Michael I.
Sim & McBurney
330 University Avenue
6th Floor
Toronto, Ontario M5G 1R7
CANADA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing *(day/month/year)*	28. 09. 00
Applicant's or agent's file reference: 1811-220/MIS	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA99/00731	11/08/1999	14/08/1998

Applicant: UNIVERSITY OF WATERLOO et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/	Authorized officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Le Bolloch, C Tel.+49 89 2399-8091

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
1811-220/MIS		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA99/00731	11/08/1999	14/08/1998
International Patent Classification (IPC) or national classification and IPC		
C08F8/42		
Applicant		
UNIVERSITY OF WATERLOO et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
21/02/2000	28. 09. 00
Name and mailing address of the international preliminary examining authority:	Authorized officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Knutzen-Mies, K Telephone No. +49 89 2399 8525

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA99/00731

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-14	as originally filed	

Claims, No.:

1-19	with telefax of	15/08/2000

Drawings, sheets:

1/6-6/6	as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	4,5,8-19
	No:	Claims	1-3,6,7
Inventive step (IS)	Yes:	Claims	9-15,18,19
	No:	Claims	4,5,8,16,17
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

ad section V.:

The most relevant prior art cited in the international search report is considered to be represented by the following documents:

D1 EP-A-709 403

D2 WO-A-97 47665

D3 EP-A-802 216 (cited as D4 in the written opinion).

D1 discloses in claims 1 - 10 a curable composition comprising a hydrocarbon polymer containing at least one alkenyl group which can undergo a hydrosilylation reaction and an organohydrogenpolysiloxane hardener containing at least two hydrosilyl groups per molecule which react by hydrosilylation reaction (melt phase) forming a branched copolymer. The hydrocarbon polymer may be polypropylene (page 3, line 7) and the organopolysiloxane is identical with the formulae according to claims 2, 3, 6 and 7 of the present application (see pages 4 - 6 of D1). The particularly preferred random copolymer MDMS of the present application is disclosed in the first formula on page 5 of D1. It is pointed out that the term 'melt phase hydrosilylation' does not exclude a polymer made in a mold, in particular, taking into account the description of the present application at page 8, lines 20 - 21 where a 'hot press' is considered as suitable equipment. In addition, the term 'branched' is not so clearly defined as to exclude crosslinks since more than two Si-H groups in the polysiloxane reactant may provide branching and crosslinking (see D2, page 6, lines 33 - 35).
The subject matter of claims 1 - 3, 6 and 7 of the present application is therefore considered to be anticipated by D1 (Article 33(2) PCT).

D3 discloses in claims 6 - 9 a copolymer of polypropylene and organopolysiloxane prepared by hydrosilylation reaction between a vinyl terminated polypropylene and an organohydrido polysiloxane having an average of at least two Si-H groups in the molecule. Since the copolymer is not restricted to any specific preparation process or distinguished by specific product parameters, this disclosure of D3 is considered to anticipate the subject matter of claims 1 - 3 of the present application (Article 33(2) PCT).

D2 is considered to represent the nearest prior art with regard to inventive step teaching a polysiloxane modified polypropylene made by hydrosilylation reaction. The difference between the presently claimed product and process and the disclosure of D2 is the polysiloxane which provides linear products in D2 and branched polymers in the present application. The problem to be solved with regard to D2 appears to be the provision of alternative polysiloxanes suitable for the hydrosilylation reaction known from D2. The problem mentioned at page 2, lines 3 - 13 of the present application regarding the problems resulting from the thermal degradation of polypropylene may and have been already solved by using eg a metallocene polypropylene or an amorphous polypropylene (see eg page 8, lines 10 - 14 of the present description and page 6, lines 8 - 10 of D2). Taking into account the teaching of D2 at page 7, lines 1 - 5, ie that using polysiloxanes having more than two Si-H groups may provide polypropylenes suitable as reactive compatibilizers, a combination with D4 teaching suitable polysiloxanes having more than two Si-H groups per molecule appears to be obvious thus suggesting the subject matter of claims 4, 5, 8, 16 and 17 of the present application (Article 3383) PCT).

ad section VIII.:

The expressions 'branched' and 'melt phase' while having a meaning for the skilled art worker have no clear and specific definition with regard to the scope of a claim and cannot therefore serve as clear, distinctive features over the prior art (Article 6 PCT).

ad section V.:

The most relevant prior art cited in the international search report is considered to be represented by the following documents:

D1 EP-A-709 403

D2 WO-A-97 47665

D3 EP-A-802 216 (cited as D4 in the written opinion).

D1 discloses in claims 1 - 10 a curable composition comprising a hydrocarbon polymer containing at least one alkenyl group which can undergo a hydrosilylation reaction and an organohydrogenpolysiloxane hardener containing at least two hydrosilyl groups per molecule which react by hydrosilylation reaction (melt phase) forming a branched copolymer. The hydrocarbon polymer may be polypropylene (page 3, line 7) and the organopolysiloxane is identical with the formulae according to claims 2, 3, 6 and 7 of the present application (see pages 4 - 6 of D1). The particularly preferred random copolymer MDMS of the present application is disclosed in the first formula on page 5 of D1. It is pointed out that the term 'melt phase hydrosilylation' does not exclude a polymer made in a mold, in particular, taking into account the description of the present application at page 8, lines 20 - 21 where a 'hot press' is considered as suitable equipment. In addition, the term 'branched' is not so clearly defined as to exclude crosslinks since more than two Si-H groups in the polysiloxane reactant may provide branching and crosslinking (see D2, page 6, lines 33 - 35).
The subject matter of claims 1 - 3, 6 and 7 of the present application is therefore considered to be anticipated by D1 (Article 33(2) PCT).

D3 discloses in claims 6 - 9 a copolymer of polypropylene and organopolysiloxane prepared by hydrosilylation reaction between a vinyl terminated polypropylene and an organohydrido polysiloxane having an average of at least two Si-H groups in the molecule. Since the copolymer is not restricted to any specific preparation process or distinguished by specific product parameters, this disclosure of D3 is considered to anticipate the subject matter of claims 1 - 3 of the present application (Article 33(2) PCT).

D2 is considered to represent the nearest prior art with regard to inventive step teaching a polysiloxane modified polypropylene made by hydrosilylation reaction. The difference between the presently claimed product and process and the disclosure of D2 is the polysiloxane which provides linear products in D2 and branched polymers in the present application. The problem to be solved with regard to D2 appears to be the provision of alternative polysiloxanes suitable for the hydrosilylation reaction known from D2. The problem mentioned at page 2, lines 3 - 13 of the present application regarding the problems resulting from the thermal degradation of polypropylene may and have been already solved by using eg a metallocene polypropylene or an amorphous polypropylene (see eg page 8, lines 10 - 14 of the present description and page 6, lines 8 - 10 of D2). Taking into account the teaching of D2 at page 7, lines 1 - 5, ie that using polysiloxanes having more than two Si-H groups may provide polypropylenes suitable as reactive compatibilizers, a combination with D4 teaching suitable polysiloxanes having more than two Si-H groups per molecule appears to be obvious thus suggesting the subject matter of claims 4, 5, 8, 16 and 17 of the present application (Article 3383) PCT).

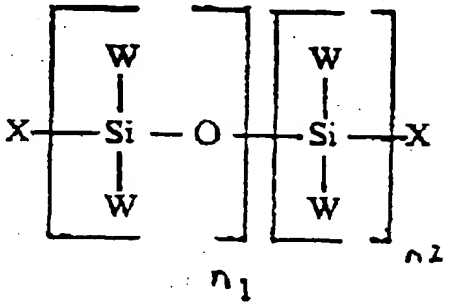
ad section VIII.:

The expressions 'branched' and 'melt phase' while having a meaning for the skilled art worker have no clear and specific definition with regard to the scope of a claim and cannot therefore serve as clear, distinctive features over the prior art (Article 6 PCT).

CLAIMS

1. A branched copolymer of polypropylene (PP) and a silicone polymer which is produced by melt phase hydrosilylation.

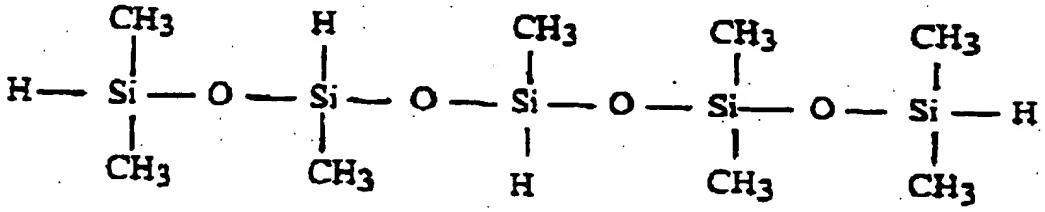
2. The copolymer of claim 1 wherein said silicone polymer is a polysilane of the Formula I:



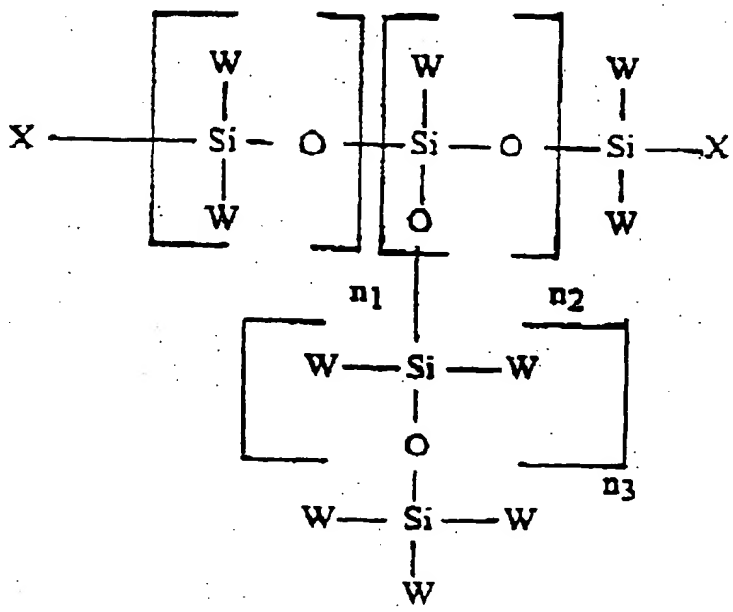
I

wherein X is an organic end group, W is an organic or inorganic group, with X and W being selected such that the polysilane contains at least two Si-H groups and sufficient to provide a branched structure, and n_1 and n_2 are the number of repeating groups in the chain.

3. The copolymer of claim 2 wherein said polysilane of formula I is a polyhydrosiloxane of the formula:



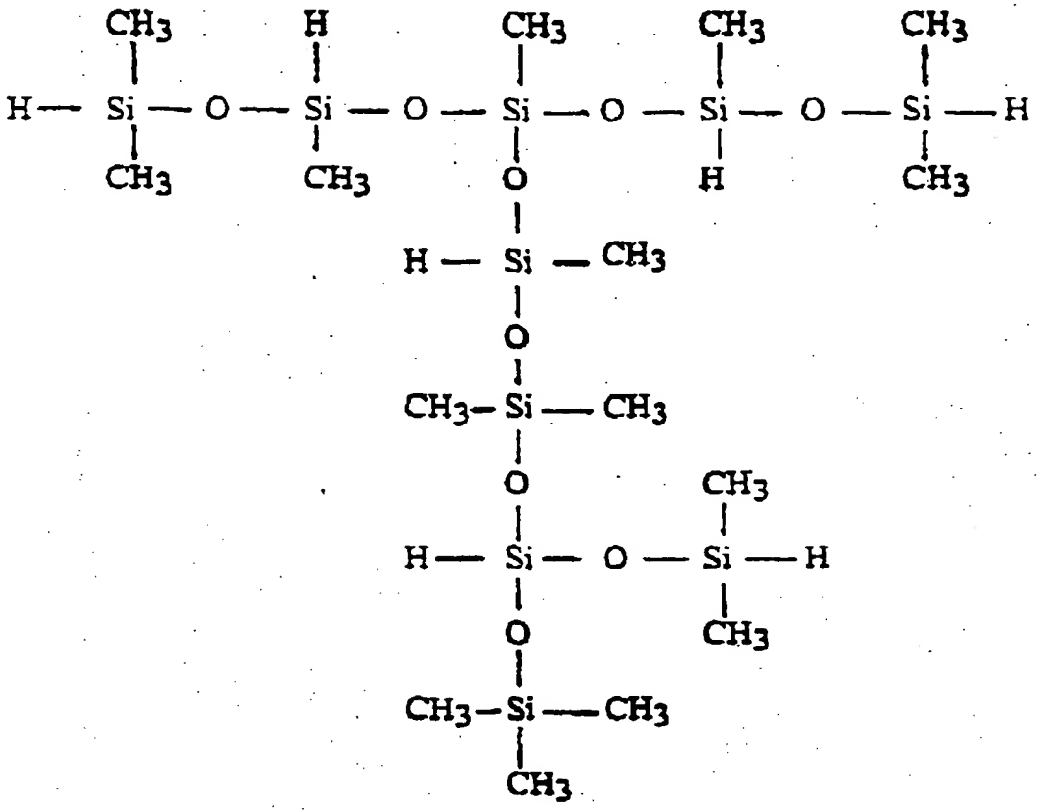
4. The copolymer of claim 1 wherein said silicone polymer is a polysilane of the Formula II:



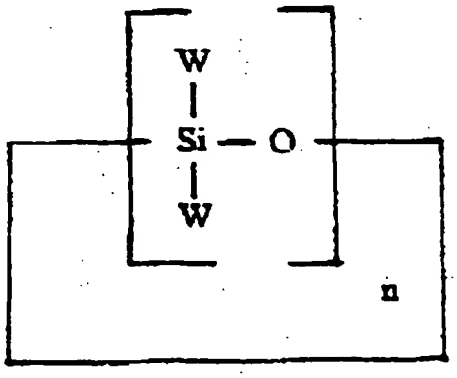
II

wherein X is an organic end group, W is an organic or inorganic group, with X and W being selected such that the polysilane contains at least two Si-H groups and sufficient to provide a branched structure, and n_1, n_2 and n_3 are the number of repeating groups in the chain.

5. The copolymer of claim 4 wherein said polysilane of Formula II is a branched polyhydrosiloxane of the formula:



6. The copolymer of claim 1 wherein said silane polymer is a polysilane of the formula III:

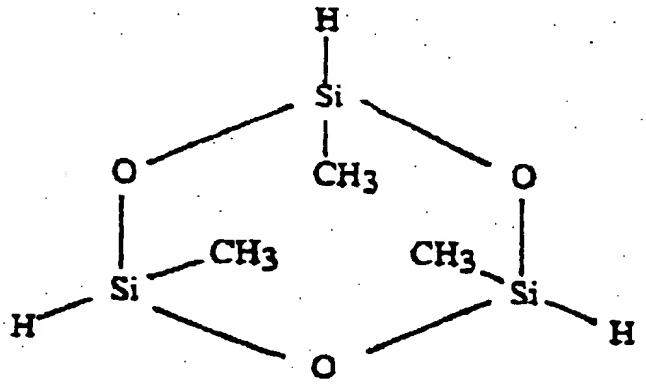


III

wherein W is an organic or inorganic group selected such that the polysilane contains at least two Si-H groups and sufficient to provide a branched structure, and n is the number of repeating groups in the chain.

7. The copolymer of claim 6 wherein said polysilane

is a cyclic polyhydrosiloxane of the formula:



8. The copolymer of claim 1 wherein said silicone polymer is a methylhydrosiloxane-dimethylsiloxane random copolymer (MDMS).

9. The copolymer of claim 8 wherein the ratio of PP to MDMS is such that the copolymer contains free Si-H groups.

10. The copolymer of claim 9 which is coupled, through free Si-H groups, to an inorganic filler, inorganic surface, a hydroxy-containing polymer, vinyl-containing polymer or other polymer containing functional groups reactive with free Si-H.

11. The copolymer of claim 10 wherein said coupling is effected by a hydrosilylation reaction or a dehydrogenerative coupling reaction.

12. The copolymer of claim 9 wherein the free Si-H groups are cross-linked.

13. The copolymer of claim 12 wherein free Si-H groups are connected into a Si-OH group by a metal-catalyzed reaction with water and subsequently dehydrogenatively coupling to a second Si-H group.

14. The copolymer of claim 12 wherein Si-H groups are reacted by dehydrogenative coupling.

15. The copolymer of claim 8 which is coupled to metallic, glass, ceramic or other vitreous surface.

16. A blend of incompatible blend partners which are polypropylene (PP) and a methylhydrosiloxane-dimethylsiloxane random copolymer (MDMS), in which the incompatible blend partners are connected by a hydrosilylation reaction in the form of a branched PP-MDMS block copolymer.

17. The blend of claim 16 containing free Si-H groups.

18. A process of forming a branched polypropylene, which comprises effecting melt phase hydrosilylation of a terminally-unsaturated polypropylene in the presence of a methylhydrosiloxane-dimethylsiloxane random copolymer (MDMS).

19. A process of forming a branched polypropylene, which comprises:

effecting hydrosilylation at a vinyl end of polypropylene with a trialkoxysilane to form a functionalized polymer, and

thereafter effecting post-reaction branching of the functionalized polymer by reacting Si-OR groups to form a Si-O-Si bridge.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
1811-220/MIS		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA99/00731	11/08/1999	14/08/1998
International Patent Classification (IPC) or national classification and IPC C08F8/42		
Applicant UNIVERSITY OF WATERLOO et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
21/02/2000	25.09.00
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Knutzen-Mies, K Telephone No. +49 89 2399 8525

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA99/00731

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-14 as originally filed

Claims, No.:

1-19 with telefax of 15/08/2000

Drawings, sheets:

1/6-6/6 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	4,5,8-19
	No:	Claims	1-3,6,7
Inventive step (IS)	Yes:	Claims	9-15,18,19
	No:	Claims	4,5,8,16,17
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

D2 is considered to represent the nearest prior art with regard to inventive step teaching a polysiloxane modified polypropylene made by hydrosilylation reaction. The difference between the presently claimed product and process and the disclosure of D2 is the polysiloxane which provides linear products in D2 and branched polymers in the present application. The problem to be solved with regard to D2 appears to be the provision of alternative polysiloxanes suitable for the hydrosilylation reaction known from D2. The problem mentioned at page 2, lines 3 - 13 of the present application regarding the problems resulting from the thermal degradation of polypropylene may and have been already solved by using eg a metallocene polypropylene or an amorphous polypropylene (see eg page 8, lines 10 - 14 of the present description and page 6, lines 8 - 10 of D2). Taking into account the teaching of D2 at page 7, lines 1 - 5, ie that using polysiloxanes having more than two Si-H groups may provide polypropylenes suitable as reactive compatibilizers, a combination with D4 teaching suitable polysiloxanes having more than two Si-H groups per molecule appears to be obvious thus suggesting the subject matter of claims 4, 5, 8, 16 and 17 of the present application (Article 3383) PCT).

ad section VIII.:

The expressions 'branched' and 'melt phase' while having a meaning for the skilled art worker have no clear and specific definition with regard to the scope of a claim and cannot therefore serve as clear, distinctive features over the prior art (Article 6 PCT).

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ad section VIII.:

The expressions 'branched' and 'melt phase' while having a meaning for the skilled art worker have no clear and specific definition with regard to the scope of a claim and cannot therefore serve as clear, distinctive features over the prior art (Article 6 PCT).

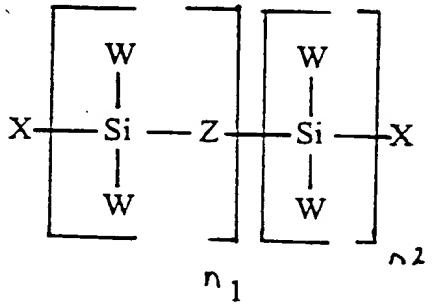
CLAIMS

What we claim is:

1. A branched copolymer of a polymer and a silicone polymer.

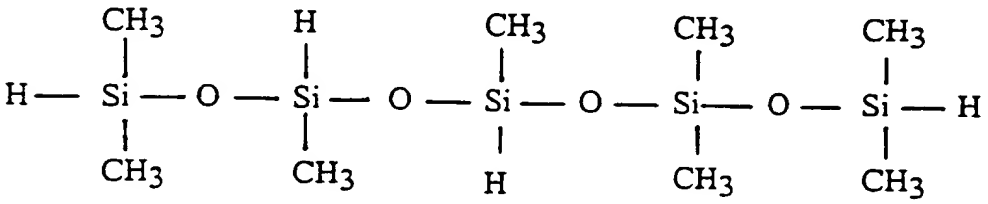
2. The copolymer of claim 1 wherein said polymer is polypropylene (PP).

3. The copolymer of claim 2 wherein said silicone polymer is a polysilane of the Formula I:

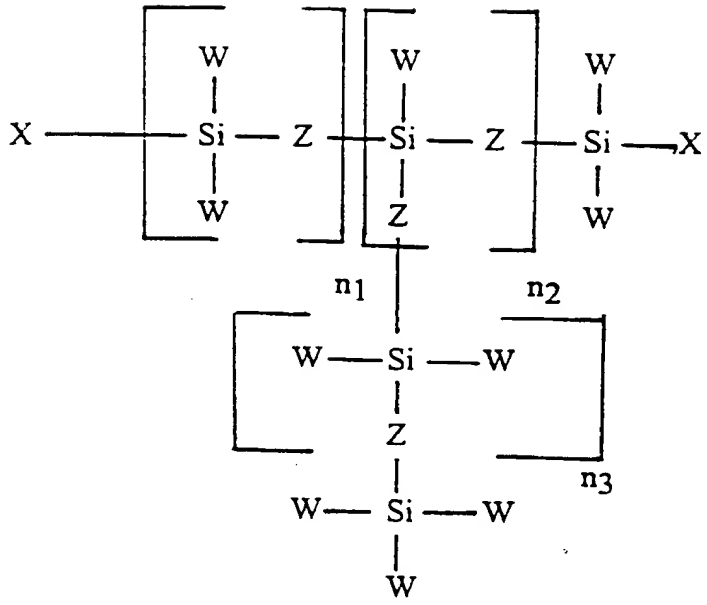


I

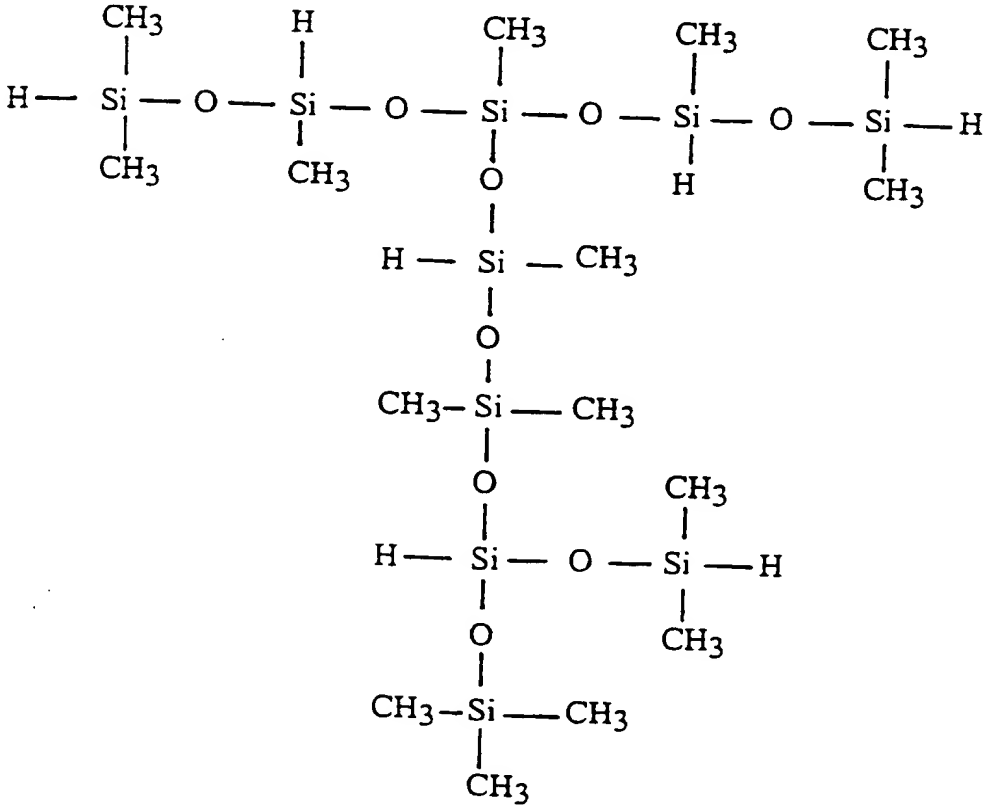
4. The copolymer of claim 3 wherein said polysilane of formula I is a polyhydrosiloxane of the formula:



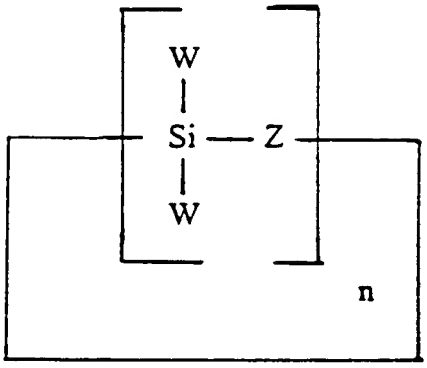
5. The copolymer of claim 2 wherein said silicone polymer is a polysilane of the Formula II:



6. The copolymer of claim 5 wherein said polysilane of Formula II is a branched polyhydrosiloxane of the formula:

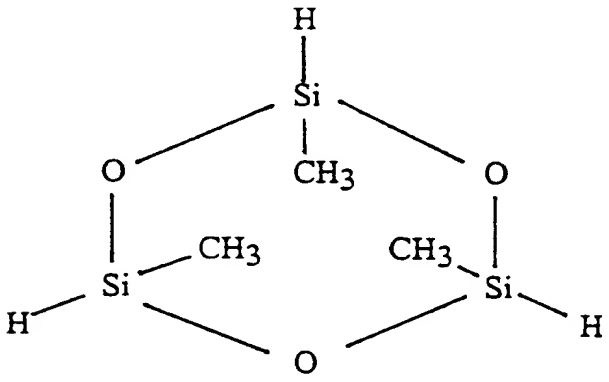


7. The copolymer of claim 2 wherein said silane polymer is a polysilane of the formula III:



- III

8. The copolymer of claim 7 wherein said polysilane is a cyclic polyhydrosiloxane of the formula:



9. The copolymer of claim 2 wherein said silicone polymer is a methylhydrosiloxane-dimethylsiloxane random copolymer (MDMS).

10. The copolymer of claim 9 wherein the ratio of PP to MDMS is such that the copolymer contains free Si-H groups.

11. The copolymer of claim 10 which is coupled, through free Si-H groups, to an inorganic filler, inorganic surface, a hydroxy-containing polymer, vinyl-containing polymer or other polymer containing functional groups reactive with free Si-H.

12. The copolymer of claim 11 wherein said coupling is

effected by a hydrosilylation reaction or a dehydrogenerative coupling reaction.

13. The copolymer of claim 10 wherein the free Si-H groups are cross-linked.

14. The copolymer of claim 13 wherein free Si-H groups are connected into a Si-OH group by a metal-catalyzed reaction with water and subsequently dehydrogenatively coupling to a second Si-H group.

15. The copolymer of claim 13 wherein Si-H groups are reacted by dehydrogenative coupling.

16. The copolymer of claim 9 which is coupled to metallic, glass, ceramic or other vitreous surface.

17. The polymer of claim 1 which is produced by melt phase hydrosilylation.

18. A blend of incompatible blend partners which are polypropylene (PP) and a silicone polymer.

19. The blend of claim 18 wherein said silicone polymer is a methylhydrosiloxane-dimethylsiloxane random copolymer (MDMS).

20. The blend of claim 14 wherein the incompatible blend partners are connected by a hydrosilylation reaction.

21. The blend of claim 20 in which the incompatible block partners are connected by said hydrosilylation reaction in the form of a branched PP-MDMS block copolymer.

22. The blend of claim 21 containing free Si-H groups.

23. The blend of claim 18 wherein the incompatible blend partners are connected by a Si-O-Si bridge.

24. A process of forming a branched polypropylene, which comprises effecting melt phase hydrosilylation of a polymer containing unsaturation in the presence of a methylhydrosiloxane-dimethylsiloxane random copolymer (MDMS).

25. The process of claim 24 wherein said polymer is terminally-unsaturated polypropylene.

26. A process of forming a branched polymer, which comprises:

effecting hydrosilylation of a unsaturation in a polymer with a trialkoxysilane to form a functionalized polymer, and

thereafter effecting post-reaction branching of the functionalized polymer by reacting Si-OR groups to form a Si-O-Si bridge.

27. The process of claim 26 wherein said hydrosilylation is effected at a vinyl end of polypropylene.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
1811-220/MIS		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/CA 99/ 00731	11/08/1999	14/08/1998
Applicant		
UNIVERSITY OF WATERLOO et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

[ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

[ ] contained in the international application in written form.

[ ] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority in written form.

[ ] furnished subsequently to this Authority in computer readble form.

[ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

[ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

[X] the text is approved as submitted by the applicant.

[ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

[X] the text is approved as submitted by the applicant.

[ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. _____

[ ] as suggested by the applicant.

[ ] because the applicant failed to suggest a figure.

[ ] because this figure better characterizes the invention.

[X] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 99/00731

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C08F8/42 C08G81/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C08F C08G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 709 403 A (KANEGAFUCHI KAGAKU KOGYO KABUSHIKI KAISHA) 1 May 1996 (1996-05-01) page 2, line 52 -page 3, line 12 page 3, line 36 -page 4, line 31 page 4, line 41 -page 7, line 39 page 9, line 14 - line 35; claims 1-10	1-4,7-27
Y	WO 97 47665 A (UNIVERSITY OF WATERLOO) 18 December 1997 (1997-12-18) cited in the application page 6, line 3 -page 7, line 5; claims 1-16	1-27
Y	US 5 663 245 A (J. P. KENNEDY) 2 September 1997 (1997-09-02) column 3, line 58 -column 4, line 65 column 5, line 4 -column 9, line 29; claims 1-16	1-27

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 November 1999	24/11/1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Permentier, W

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 99/00731

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 802 216 A (DOW CORNING ASIA, LTD.) 22 October 1997 (1997-10-22) page 2, line 24 -page 4, line 49; claims 1-9	1-27
A	US 5 641 835 A (S. D. SMITH) 24 June 1997 (1997-06-24) claims 1-17	1
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A	DE 36 17 902 A (J. A. LAPICKIJ) 3 December 1987 (1987-12-03) claims 1-5	1

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

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PCT/CA 99/00731

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